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Kenneth J. Hines

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EXAMINER

ROCHE, TRENTON J

ART UNIT

PAPER NUMBER

2193

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/885,448

Applicant(s)

HINES, KENNETH J.

Examiner

Trenton J. Roche

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 18-20 and 31-38 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-5, 18-20 and 31-38 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 19 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to communications filed 8 August 2006.
2. Per applicant's request, amended claims 1, 18, 31 and 36 have been entered. Claims 1-5, 18-20 and 31-38 are currently pending.
3. Claims 1-5, 18-20 and 31-38 have been examined.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5, 18-20 and 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,965,743 to Malin et al. (hereinafter "Malin"), in view of "Debugging Heterogeneous Distributed Systems Using Event-Based Models of Behavior" by Bates.

Per claim 1:

Malin discloses:

- generating a record of software system events, each event record within the record of system events representing an inter-component control or dataflow interaction ("The results of the simulation can either be permanently recorded in a log file or debug text..." in col. 13 lines 34-36)

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- creating a behavioral template based on a predetermined behavior of the software system (“the library designer is able to create the knowledge representation information that is needed for the creation of models and the simulation of such models” in col. 15 lines 44-47)
- wherein the predetermined behavior comprises a predetermined set of state changes selected from an execution of the software system, wherein the predetermined set of state changes represent coherent units of behavior by the system software (“Discrete event modeling and simulation is characterized by state changes in a system’s entities, ‘events’, that occur...” in col. 4 lines 14-16. Further, note Figure 15 and the corresponding sections of the disclosure. “the method Run [model] in which the discrete event simulator runs the model by executing events on the event queue until the queue is empty” in col. 25 lines 17-19. The events are predetermined state changes, as there is a predetermination concerning placing events in the queue, which further represent coherent units of behavior by the software system, as an event is indicative of some action or behavior by the system.)
- identifying an occurrence of the predetermined behavior within the record of software system events, based on the behavioral template (“Additional analysis is obtained by comparison of log files to specify the differences in outcomes...” in col. 10 lines 52-53)
- wherein the predetermined set of state changes may be used as a behavioral model for a debugger to recognize (The state changes are represented as a behavioral model as noted above, and further, the user of the system of Malin has access to a debug facility as noted in col. 29 lines 8-9, which gives debug information for the system.)

substantially as claimed. Malin does not explicitly disclose replacing a found instance of a predetermined behavior with a replacement sequence of events, wherein the replacement sequence of events is an abstract even of a higher level than one or more system events that comprise the

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predetermined behavior. Bates discloses in an analogous behavior-based modeling and debugging system the ability recognize a stream of system events, and abstract the recognized behaviors into a high-level abstract event (“When a user-defined behavior model is successfully matched to the event stream, this derived behavior is abstracted into a representative high-level event...” on page 5, section 2.1. Since the behavior is abstracted *into* (emphasis added) a representative high-level event, the high-level event replaces the behavior.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to consolidate a series of events in the system disclosed by Malin according to the abstraction techniques disclosed by Bates, as this would enable a user of Malin’s system to manage complexity, help organize the search for errors, and enhance the operation of debugging tools for distributed system, as disclosed by Bates on page 2, section 1. Furthermore, abstraction would formalize the modeling process and help to focus a tool user’s attention on significant behaviors, as further noted by Bates in the paragraph bridging pages 2 and 3 of section 1.

Per claim 2:

The rejection of claim 1 is incorporated, and further, Malin discloses creating the behavioral template comprises creating a visual prototype, which represents the predetermined behavior of the software system as claimed (“This module allows the model builder to construct a model graphically...” in col. 24 lines 58-59)

Per claim 3:

The rejection of claim 1 is incorporated, and further, Malin discloses creating a behavior expression, which represents the predetermined behavior of the software system as claimed (“Statements are associated with processes...They are written in terms of the operators, component variables

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inherited from the VCs, and the values of the valueclasses defined in the language” in col. 24 lines 26-30)

Per claim 4:

The rejection of claim 1 is incorporated, and further, Malin discloses simulating an execution of the software system, with the record of software system events generated by the simulator as claimed (“The results of the simulation can either be permanently recorded in a log file or debug text...” in col. 13 lines 34-36)

Per claim 5

The rejection of claim 1 is incorporated, and further, Malin discloses instrumenting the software system to provide an event notification to a runtime operating system for each software system event, and deploying the software system to a target architecture, and capturing all notifications from the software system and storing the event notifications to create a record of software system events as claimed (Note Figure 1, item 132.1. To perform a trace of the system, and for the Log file to have been created, the system inherently had instrumentation to provide event notification so that the events could be recorded. Further, the simulation is inherently running on a target architecture.)

Per claim 18:

Malin discloses:

- a software system design tool (“A specialized qualitative modeling and discrete event simulation tool...” in col. 10 lines 3-4)

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- a simulator for simulating an execution of the software system (Note Figure 1, item 13 and the corresponding section of the disclosure)
- a template tool for creating a behavioral template based on a predetermined behavior of the software system (“the library designer is able to create the knowledge representation information that is needed for the creation of models and the simulation of such models” in col. 15 lines 44-47)
- wherein the predetermined behavior comprises a predetermined set of state changes selected from an execution of the software system, wherein the predetermined set of state changes represent coherent units of behavior by the system software (“Discrete event modeling and simulation is characterized by state changes in a system’s entities, ‘events’, that occur...” in col. 4 lines 14-16. Further, note Figure 15 and the corresponding sections of the disclosure. “the method Run [model] in which the discrete event simulator runs the model by executing events on the event queue until the queue is empty” in col. 25 lines 17-19. The events are predetermined state changes, as there is a predetermination concerning placing events in the queue, which further represent coherent units of behavior by the software system, as an event is indicative of some action or behavior by the system.)
- wherein the predetermined set of state changes may be used as a behavioral model for a debugger to recognize (The state changes are represented as a behavioral model as noted above, and further, the user of the system of Malin has access to a debug facility as noted in col. 29 lines 8-9, which gives debug information for the system.)
- a debugging tool for identifying an instance of the predetermined behavior of the software system from a simulated execution of the software system based on the behavioral template (“Additional analysis is obtained by comparison of log files to specify the differences in

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outcomes..." in col. 10 lines 52-53. Further, "the debug facility allows the user to turn debug on or off..." in col. 29 lines 8-9)

substantially as claimed. Malin does not explicitly disclose replacing a found instance of a predetermined behavior with a replacement sequence of events, wherein the replacement sequence of events is an abstract even of a higher level than one or more system events that comprise the predetermined behavior. Bates discloses in an analogous behavior-based modeling and debugging system the ability recognize a stream of system events, and abstract the recognized behaviors into a high-level abstract event ("When a user-defined behavior model is successfully matched to the event stream, this derived behavior is abstracted into a representative high-level event..." on page 5, section 2.1. Since the behavior is abstracted *into* (emphasis added) a representative high-level event, the high-level event replaces the behavior.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to consolidate a series of events in the system disclosed by Malin according to the abstraction techniques discloses by Bates, as this would enable a user of Malin's system to manage complexity, help organize the search for errors, and enhance the operation of debugging tools for distributed system, as disclosed by Bates on page 2, section 1. Furthermore, abstraction would formalize the modeling process and help to focus a tool user's attention on significant behaviors, as further noted by Bates in the paragraph bridging pages 2 and 3 of section 1.

Per claim 19:

The rejection of claim 18 is incorporated, and further, note the rejection regarding claim 2.

Per claim 20:

The rejection of claim 18 is incorporated, and further, note the rejection regarding claim 3.

Per claims 31-35:

The limitations recited in claims 31-35 are substantially similar to those recited in claims 1-5, respectively, and as such, are rejected for the reasons set forth in connection with claims 1-5, respectively.

Per claims 36-38:

The limitations recited in claims 36-38 are substantially similar to those recited in claims 18-20, respectively, and as such, are rejected for the reasons set forth in connection with claims 18-20, respectively.

Response to Arguments

6. Applicant's arguments filed 8 August 2006 have been fully considered but they are not persuasive.

Per claims 1-5, 18-20 and 31-38:

Applicant states that Marlin and Bates, taken alone or in combination, fail to teach or reasonably suggest the predetermined set of state changes being used as a behavioral model for a debugger to recognize. In response, the Examiner notes that the system of Marlin allows creation of behavioral models for predetermined sets of state changes, as noted in the rejection of claim 1 and col. 4 lines 14-16 and col. 15 lines 44-47. Furthermore, the user of the system of Marlin has access to a debug facility which will provide system information upon simulation of the models, as noted in col. 29

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lines 8-9. As such, Marlin discloses the required limitations of the behavioral models being recognized and used by a debugger. The rejection is proper and maintained.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trenton J. Roche whose telephone number is (571) 272-3733. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit 2193

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